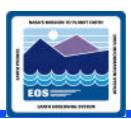


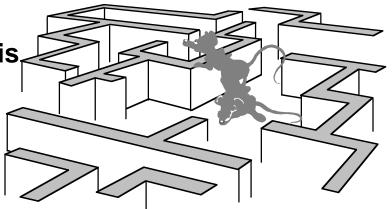
### **CONFIGURATION MANAGEMENT**

### **ECS Pre-Release B Testbed Training**

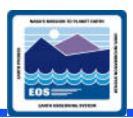
### **Overview of Lesson**



- Introduction
- Configuration Management Topics
  - M&O role in CM activities
  - Configuration Control Boards (CCBs)
  - Configuration Change Request (CCR) Process
  - Software Change Process
  - Hardware Change Process
  - Requests for Impact Analysis,
- Practical Exercise



## **Objectives**



- Overall: Proficiency in ECS Configuration Management
  - Describe M&O role in CM activities
  - List Configuration Control Boards (CCBs), roles, and responsibilities
  - Process a Configuration Change Request (CCR)
  - Prepare a request for impact analysis
  - Process a software change
  - Process a hardware change

### **Importance**

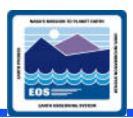


Lesson provides preparation for several roles to ensure effective CM for implementation of system changes



- CM Administrators
- System Engineers, System Test Engineers,
   Maintenance Engineers

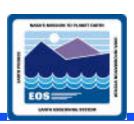
### **M&O** Role and CM Activities

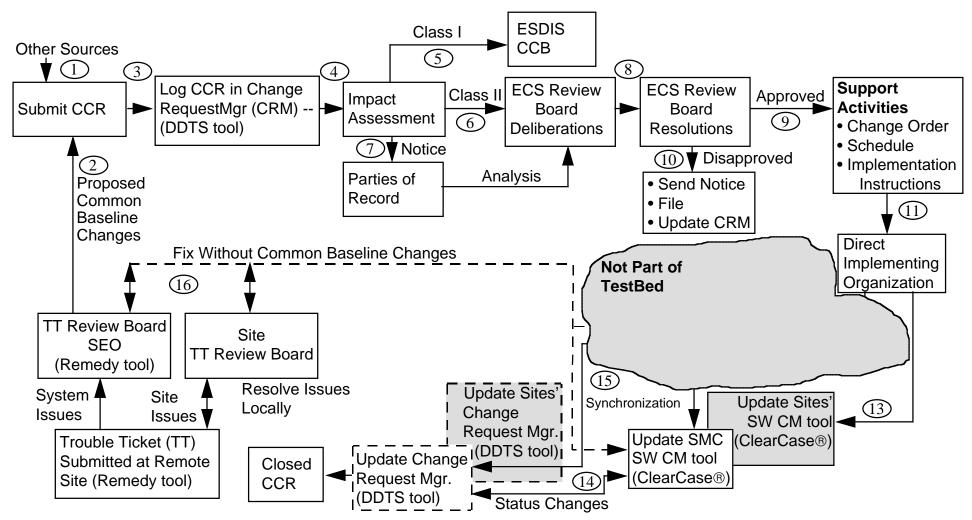


### Maintenance and Operations CM activities

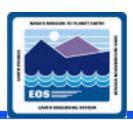
- After acceptance of ECS
- Administrative and technical support of change control
- Documentation and coordination of changes to site hardware, software, and procedures
- Configuration identification
  - Maintenance and control of technical documentation
- Configuration status accounting
  - Recording and reporting information about the configuration status of ECS documentation, hardware, and software
- Configuration audits
  - M&O supports internal and ESDIS assessments of project compliance with relevant CM plans

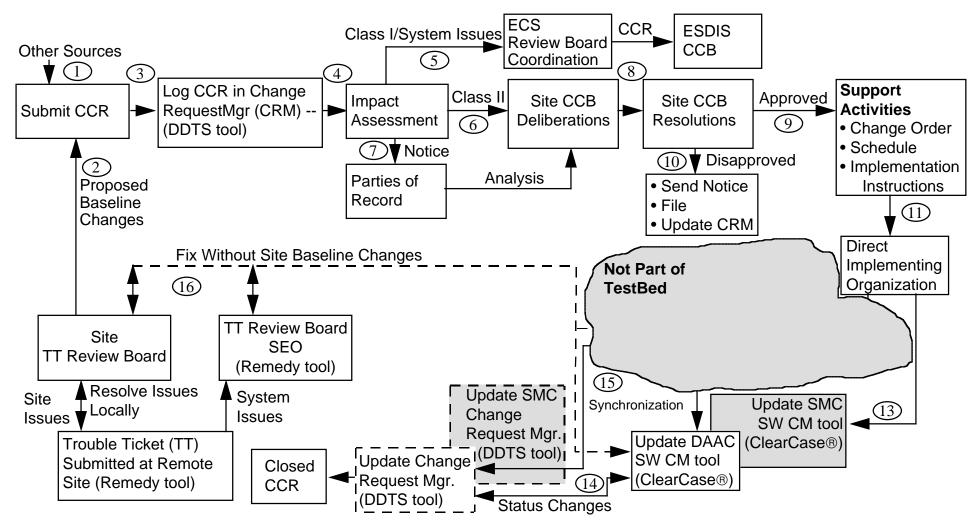
## **Change Control - SEO Level**



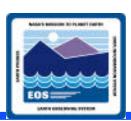


## **Change Control - Site Level**

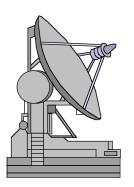




### M&O Role and CM (Cont.)

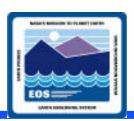


- Science Software CM
  - SSI & T: DAAC management and I &T team
  - M&O support during I & T
  - support DAAC Manager after acceptance



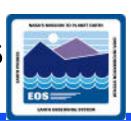
- SEO -- Liaison between sites and ESDIS CCB
  - maintenance of project software library
  - dissemination of controlled items to sites
  - M&O ensures coordination and availability of needed data

### **Maintenance of Software Libraries**



- Maintenance of M&O Software Library
  - both common and site-specific software
  - site personnel responsible for CM associated with library
- Library supported and controlled by ClearCase®
  - manages sharing and control of source, object, and executable files
  - tracks software build process
  - automates enforcement of operational policies and procedures
  - tracks source elements and documentation, providing record of configuration items, their attributes, and a change history for each item

## **Change Control and Software Libraries**



Note: For TestBed, master copy of code is maintained at EDF.

SEO Software Change Manager

Golden copy of ECS Software Maintained by SEO

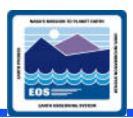


EOC
Software Change
Manager

On-site Software Libraries

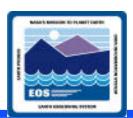
### M&O Role and CM (Cont.)

(NOTE: No CSR, RRR, ORR for TestBed)



- Baseline control milestones during maintenance and operations
  - Installation Plan (IP): COTS hardware configuration
  - Consent to Ship Review (CSR): hardware and software configuration and plans for host sites
  - Release Readiness Review (RRR): documents state of configuration items at each host site
  - Operational Readiness Review (ORR): documents the fully integrated EOS Ground System (EGS)
- Site authority
  - ESDIS authority over changes to common software
  - site CCB authority over site-specific Class II changes
  - site-specific parameters for COTS software
  - specific configuration of tools and utilities, as delegated by ESDIS

### **Configuration Identification**

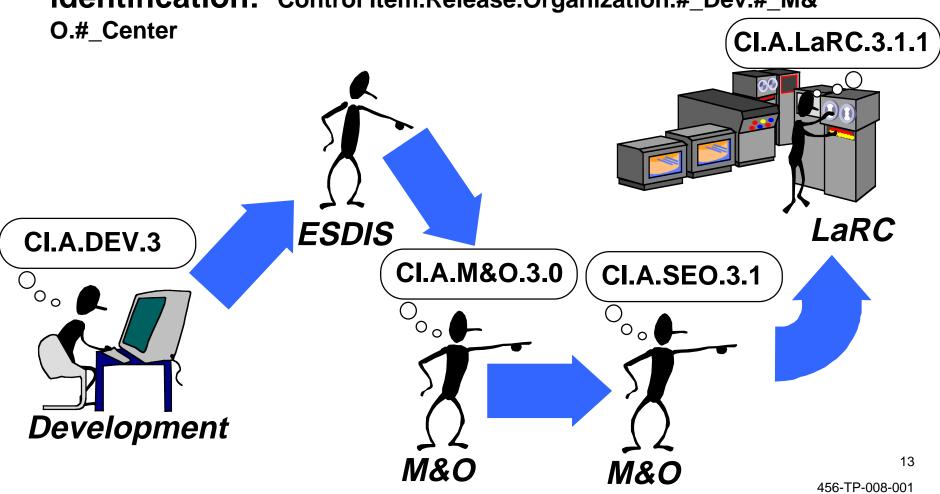


- Establishes unique identifiers for ECS control items: Hardware, Software, Databases, Documentation
- Developer Guideline References
  - ESDIS CM Plan
  - MO&DSD CM Plan
  - ECS M&O CM Plan
  - Software Build Process Project Instruction
  - Software Naming Conventions Project Instruction
  - Directory and File Name Guidelines and Standards for ECS
  - Document Numbering, DM-1\_002
  - DoD MIL-STD-973

# **Configuration Identification (Cont.)**

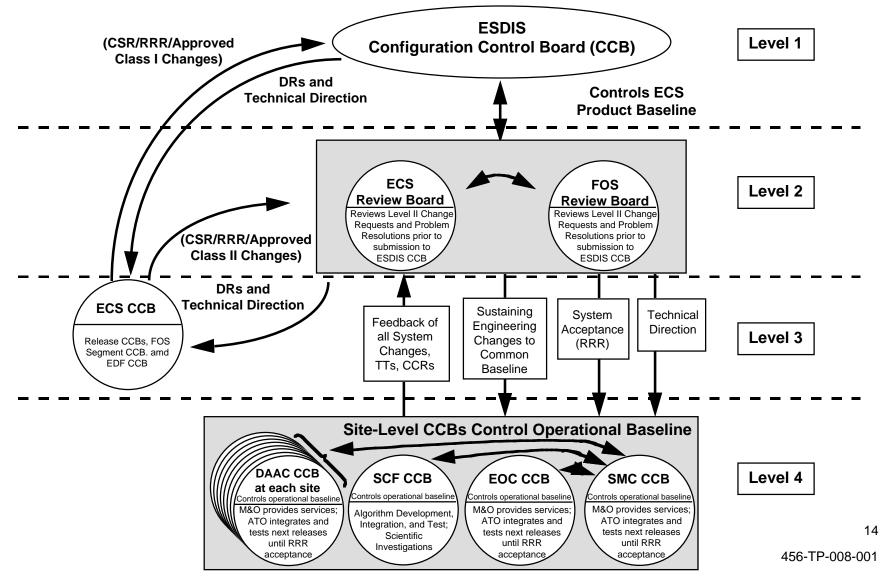


• Standard format for ECS extended configuration identification: Control Item.Release.Organization.#\_Dev.#\_M&

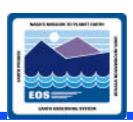


## **CCB Hierarchy**





## **CM** Responsibilities



- ESDIS Management
  - establishes ECS CM policies

#### CCBs



- CM Administrators (at SEO, EOC, DAACs, SCFs)
  - establish and maintain CM records
  - facilitate the configuration change request (CCR) process
  - monitor and report status of proposed and approved
     CM actions
  - support their respective CCB (as required)

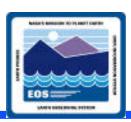


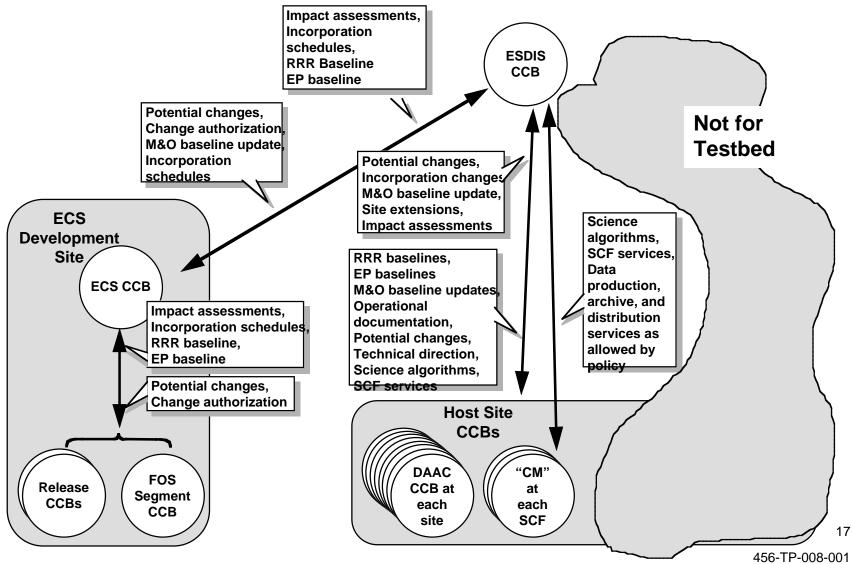
# **CM** Responsibilities (cont.)



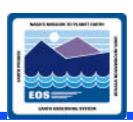
- Sustaining Engineering Organization (SEO) --
  - assesses feasibility and cost, schedule and performance impacts of proposed system-wide changes
  - implements such changes when directed by ESDIS
- DAAC Sustaining Engineers ---
  - assess DAAC impacts of system-wide proposed changes
  - develop and maintain ESDIS-approved DAAC-specific modifications to ECS products
- Maintenance Engineers ---
  - maintain ECS HW and report configuration changes resulting from maintenance actions

# **CCB** Relationships



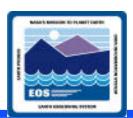


# Science Software and Change Control



- Science Computing Facility (SCF) performs configuration control
  - Software and Databases to be executed at another site
  - SCF resources that are made available to EOSDIS community
- ECS M&O function directed by DAAC CCB
  - Accepts science software and data from the SCF
  - Provides services to support EOC control of the EOC operational baseline
- Central coordination by ECS Review Board
  - ECS integrity and quality of service
  - Coordination with internal and external networks, systems, facilities
  - ESDIS CCB visibility into ECS operations
  - Convenient user administrative services

# Configuration Change Requests (CCRs)



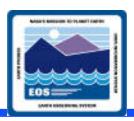
### No undocumented changes

- all requests for change documented using CCR form
- CCR generated against the baseline affected by the proposed change
- Form can be completed electronically
  - Word processing form
  - Change Request Manager tool (CM Administrator)

#### CCB review

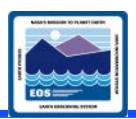
- CCR submitted to appropriate CCB
- CCR form may also be a cover sheet for a request to CCB for a deviation or waiver from baseline

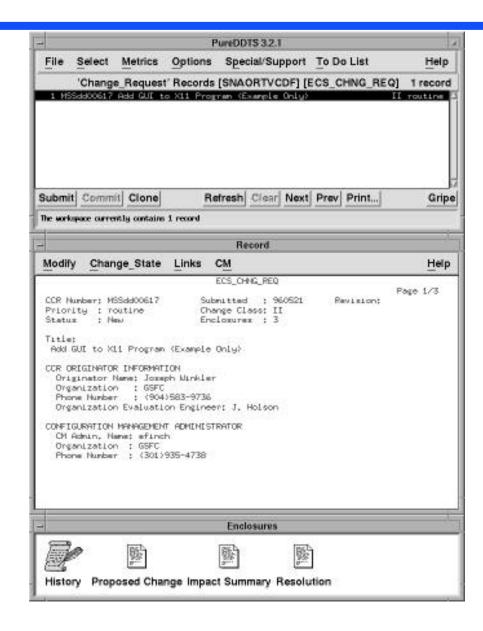
### **ECS CCR Form**



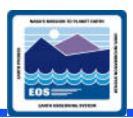
1. Configuration C ESDIS: ECS: ASF, EDC,	_ SMC: DA	.AC: GSFC, LaF	RC,	2. CCR No.	
3. Submitted Date:	4. Revision	5. Priority Emergency Urgent Routine	6. Chan	ge Class	7. Status
8. CCR Title:					
9. Originator: 10. Approval:	signature	Org:	e-mail:	ph	one:
11. Reason for Char				(indicate a	ittachment
<ul><li>11. Reason for Char</li><li>12. Description of C</li></ul>					ittachment
12. Description of C  13. Impact Analysis. Cost: None (N)  Evaluation Engineer. Impact Evaluators: I	hange  Small of exceeding \$100,000	□ Medium □) (\$100,000 to \$500,000) Org: Dev; SEO; _, JPL, NSIDC_	e-mail: SMC;	(indicate a Large Over \$500,000) phone DAACs: GS ; EOC	ittachment
12. Description of C  13. Impact Analysis Cost: None Evaluation Engineer Impact Evaluators: Impact Evaluators: LaRC, As	hange  Small of exceeding \$100,000  SDIS; ECS SF, EDC	Org: Dev; SEO; , JPL, NSIDC_	e-mail: SMC;	(indicate a Large Over \$500,000) phone DAACs: GS ; EOC (indicate a	e: SFC,
12. Description of C  13. Impact Analysis Cost: None Evaluation Engineer Impact Evaluators: Infact Evaluators: LaRC, AS	mange  Small ot exceeding \$100,000  ESDIS; ECS  F, EDC  cate Sites/ Organiz  Approved  red: □ECP□V	Org: Dev; SEO; , JPL, NSIDC_ extractions Affected)	e-mail: SMC; _, ORNL_	(indicate a	S: SFC, ;tttachment

# **Change Request Manager (DDTS)**



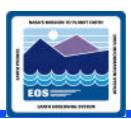


### Request for Impact Analysis



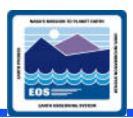
- Support of ESDIS CCB may require assessment of the impact of a proposed CCR on local or system maintenance and operations
- Assessing the impact of CCRs with significant system implications and/or potential system-wide application may require the assistance of the ECS development organization
- Formal request for impact assessment according to DAAC procedures
- Impact assessments consolidated into a CCR Impact Summary

# **CCR Impact Analysis Form**



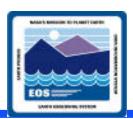
Responder Request Number:	Evaluation Engineer:
Responder: Responder Point of Contract:	Evaluation Engineer Point of Contact: address:
address:	address
	phone:
phone:	e-mail:
e-mail:	Requested Return Date:
CCB Schedule Date:	
CCR Number:	
CCR Log Date:	
CCR Originator:	
CCR Originator Point of Contract:	
address:	
phone:	
e-mail:	
Technical Assumptions and Comments:	0
Small [ ] < \$100,000 Medium [ ] \$100,000 < x < \$500,000	0
Technical Assumptions and Comments:  Cost Impact:     None [ ]     Small [ ] < \$100,000     Medium [ ] \$100,000 < x < \$500,000     Large [ ] > \$500,000  Schedule Impact:  Technical Assessment: ( Your impact analinterfaces affected; HW or SW changes recording from/to pages; suggested alternatives, if an	alysis should consider the implementation approach; quired; documentation changes required change by; and impact to security features. If your system is no
Technical Assumptions and Comments:  Cost Impact:     None [ ]     Small [ ] < \$100,000     Medium [ ] \$100,000 < x < \$500,000     Large [ ] > \$500,000  Schedule Impact:  Technical Assessment: ( Your impact analinterfaces affected; HW or SW changes record from/to pages; suggested alternatives, if an impacted, please provide that information to	alysis should consider the implementation approach; quired; documentation changes required change by; and impact to security features. If your system is no
Technical Assumptions and Comments:  Cost Impact:     None [ ]     Small [ ] < \$100,000     Medium [ ] \$100,000 < x < \$500,000     Large [ ] > \$500,000  Schedule Impact:  Technical Assessment: ( Your impact analinterfaces affected; HW or SW changes record from/to pages; suggested alternatives, if an impacted, please provide that information to	alysis should consider the implementation approach; quired; documentation changes required change y; and impact to security features. If your system is no o the CM Administrator.)
Technical Assumptions and Comments:  Cost Impact:     None [ ]     Small [ ] < \$100,000     Medium [ ] \$100,000 < x < \$500,000     Large [ ] > \$500,000  Schedule Impact:  Technical Assessment: ( Your impact and interfaces affected; HW or SW changes recommends)	alysis should consider the implementation approach; quired; documentation changes required change by; and impact to security features. If your system is no

# **CCR Impact Summary**



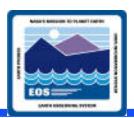
CCR Impact Summary				
Evaluation Engineer:  Evaluation Engineer Point of Contact:    address:  phone: e-mail:  CCR Board Date:				
Resources Summarized:				
Technical Summary:				
ROM Summary (BOE, Cost, and Schedule):				
Recommendation:				
	Signed: (Evaluator) Date:			

## Software Baselines and Changes



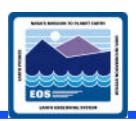
- Software release is through ESDIS SMC or, with ESDIS permission, directly to the sites
  - Version Description Document (VDD) provides summary documentation package
  - ECS Project CMO assembles and packages the delivery
- Change Scenarios
  - COTS software problem
  - custom software problem
  - science software upgrade
  - COTS software upgrade
  - system enhancement

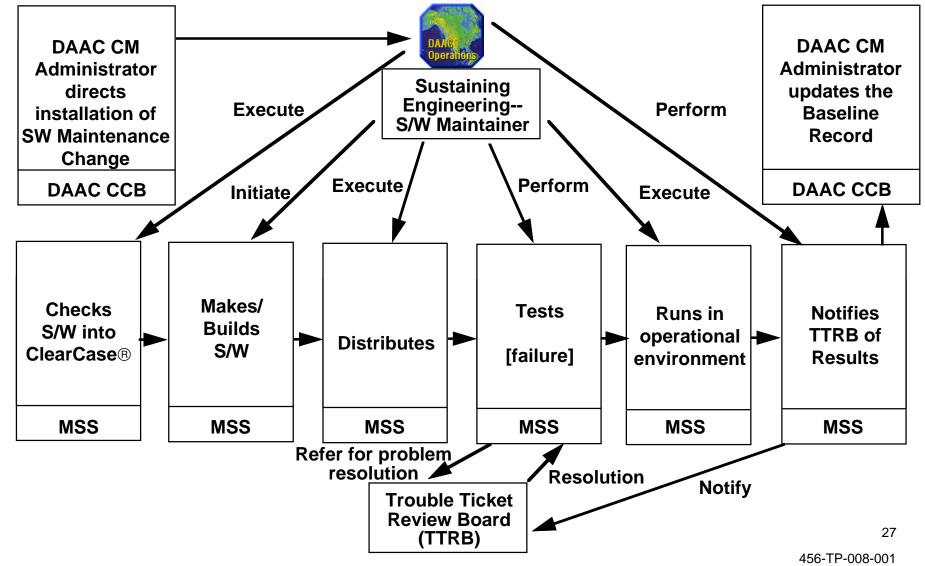
### Software Transfer and Installation



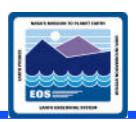
- Change originates at SEO
- SEO CM Administrator provides ECS systemwide CM
- SEO CM Administrator directs transfer to DAAC drop-off point
- SEO CM Administrator ensures that changes are properly documented and coordinated

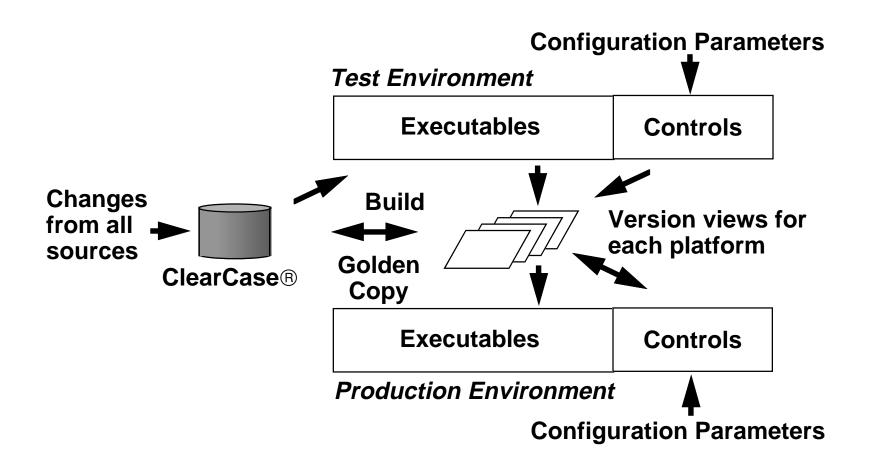
# Software Transfer & Installation: Installation Functional Flow



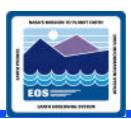


### ClearCase®: Site Installation of SW



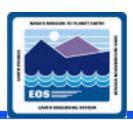


### **Software Change Installation**



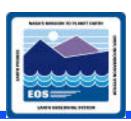
- Review/approval by ESDIS
- VDD final updates for system and center-specific material; final VDD is published
- Installation of the build and operational and user documentation IAW installation schedule
  - ClearCase®: Multiple versions of production software always retained
  - Scripts for System Administrator to do installation
- Controlled document updates provided to SEO Document Maintenance and entered into CM
- CM system updated to reflect M&O and centerspecific baselines

### **Hardware Baselines and Changes**



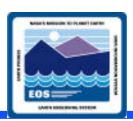
- Hardware baseline established at Release Readiness Review (RRR) following formal Physical Configuration Audit (PCA)
  - ESDIS approves establishment of operations baseline
  - Configuration baseline recorded in Version Description Document (VDD)
  - M&O conducts testing of builds to ensure proper implementation of CCRs with no defects introduced
- Change Scenarios
  - COTS hardware problem repair that requires a CCR
  - System enhancement

## **Hardware Change Installation**



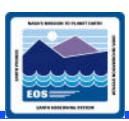
- Repair with part of same make, model, version does not require CCR
- Change in make, model, version of a part to be used for repair, e.g., in an emergency, necessitates CCR to document the change
  - Review/approval by site CCB
  - Review by SEO/ESDIS for impacts/applicability to other sites
  - Provision of controlled document updates to SEO
     Document Maintenance and entry into CM
  - CM system updates to reflect change

### **Hardware Configuration Audits**

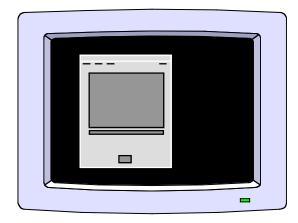


- SEO supports FCA/PCA by the Acceptance Testing Organization (ATO) at RRR
- SEO conducts internal audits
  - CM policies, procedures, and practices followed
  - Proper implementation of approved changes
  - As-built documentation reflects deployed configuration
- SEO supports ESDIS CM audits
  - As-built configuration reflects CI documentation
  - Test results verify performance
  - As-built configuration shipped reflects tested configuration
  - Untested requirements verified by interfacing documentation
  - COTS products audited as part of baseline

## **Changes to the Baseline**



- CM Tools for baseline changes
  - Change Request Manager: DDTS



- Related tools
  - From Management Subfunction software
    - Trouble Ticket System (TTS)
    - Problem reporting and tracking
    - Used by users, operators, system administrators

## **CCR Approval Flow**

